E. The Commission Must Ensure that Incumbent Licensees Receive Adequate Compensation for Spectrum from Which They Are Displaced

27. API generally agrees with the Commission's proposed plan for negotiations between PCS and POFS licensees for spectrum access. API agrees that "open" and relatively unfettered negotiation arrangements will permit marketplace forces to achieve a balance between the spectrum needs of PCS and POFS operators. More specifically, the 5-year voluntary relocation period proposed by API should commence upon the date that the Commission first licenses PCS systems in the 2 GHz band. Within that five-year voluntary relocation time frame, PCS operators should be free to negotiate for spectrum with incumbent POFS licensees. Such negotiations should be allowed to take place with a minimum of oversight by the Commission, since free and open negotiations will ensure that a balance is struck between POFS and PCS spectrum demands. At the end of the voluntary relocation period, an involuntary relocation program could be established along the lines proposed by the Commission.[11/]

28. While generally supportive of the proposed involuntary relocation approach, API has reservations concerning calculation of relocation costs, evaluation of the

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11/ Notice, ¶ 47.

relative merits of replacement spectrum and/or technologies and questions concerning who would be designated to arbitrate such issues. One relocation cost that must clearly be recognized is that associated with maintaining system integrity. 2 GHz facilities operated by API member companies are complex communications "systems," not individual microwave stations. PCS operators should not be allowed to merely "cannibalize" these systems by offering to compensate users for discrete stations which happen to be in the area in which the PCS operator proposes to market its service. The relocation costs must take into consideration the expenses which a licensee must incur to ensure that its entire microwave system will continue to function at a high degree of reliability even if he is only being forced to actually replace one or two links in the system. This is will mean that if, for example, several links in the system in an urban area must be replaced to accommodate PCS operations, the PCS operator will pay for any interface equipment or other facilities that may be required to integrate a 6 GHz path into the existing 2 GHz system. While such hybrid systems can be patched together, changing bands within a system does affect reliability, and special steps must be taken to ensure that the system operates acceptably when the licensee is forced to take such steps. The Commission must ensure that system integrity is maintained and that PCS operators pay the

reasonable costs associated with this aspect of moving portions of 2 GHz systems to other frequency bands. As long as these costs are taken into account, API agrees with the Commission's proposal that a new user who requests involuntary relocation of an existing POFS licensee must assume responsibility for all relocation costs and must understand that the proposed replacement facilities must provide equal or better reliability than the relocated POFS operator's existing system.

29. Further, the new user must understand that incumbent licensees will have adequate opportunities to oppose relocation proposals, and if new facilities prove unsatisfactory in practice, that the incumbent must be located back to its original frequency assignment at the new user's expense.12/ The PCS proponent must pay the cost of transition including such expenses as replacement of analog equipment with digital since digital equipment is more readily available, and all expenses related to maintaining system integrity and reliability. In addition, cost calculations must also include engineering and installation time expenditures, even if performed by the affected company's personnel.

12/ Id.

30. Additionally, inherent in any such scheme is the necessity of an "arbiter" to decide such questions as actual relocation costs and satisfactory performance/reliability of replacement technology or spectrum. API believes that since the Commission clearly has expressed a preference for rapid deployment of PCS service in the band, an "independent arbitrator" must be included in the transition plan to ensure fundamental fairness to all parties concerned. While API has no specific recommendation on this point, it is possible that guidance from the American Arbitration Association (AAA) could prove helpful to the Commission in determining a method by which all parties involved in relocation activity could be assured that decisions would be rendered by an impartial arbitrator.

F. The Commission Must Address API's Proposal to Dedicate the Frequency Bands 901-902/940-941 MHz for Emergency Response Communications

31. The Commission proposed to allocate 3 MHz of the 900 MHz spectrum for narrowband PCS services: 901-902 MHz, 930-931 MHz and 940-941 MHz.[13/] These bands are now reserve

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13/ NPRM and Tentative Decision at 21.

bands for advanced paging and general purpose mobile services.14/ While API supports the Commission's efforts to dedicate spectrum for PCS outside the 2 GHz band, the Agency has again ignored an urgent request for use of some of this spectrum made by API in its Comments to the Notice of Inquiry in this same proceeding. API proposed that some channels from the bands 901-902 MHz and 940-941 MHz be allocated nationwide for emergency response communications for Industrial/Land Transportation eligibles.15/ In those Comments, API explained that immediate and reliable communications facilities are critical to the success of oil spill containment and cleanup operations, and avoiding delays in responding to those spills that have a harmful impact on the environment. API stressed that there is a lack of frequency assignments available for the type of emergency response communications which are essential after major oil spills or other disastrous situations.16/ API recommended a nationwide allocation from

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14/ See First Report and Order, GEN Docket No. 80-183, 47 Fed. Reg. 24577 at ¶ 14 (1982), and Report and Order, GEN Docket Nos. 84-1231, 84-1233 and 83-1234, 2 F.C.C.R. 1825 (1986).

15/ See Comments of API at pp. 38-53 and Exhibit E to the Notice of Inquiry, GEN Docket No. 90-314, 5 F.C.C.R. 3995 (1990).

16/ In Docket No. 20027, the Commission allocated only ten channels in three different frequency bands for use in oil spill containment and cleanup operations: 25.04 MHz, 25.08 MHz, 36.25 MHz, 41.71 MHz, 150.980 MHz, 154.585 MHz, 159.480 MHz, 454.000 MHz, and 459.000 MHz. 47 C.F.R.

(continued...)

the 901-902/940-941 MHz band consisting of 15 channel pairs with a bandwidth of 12.5 kHz to be regulated under Subparts D and E of Part 90 of the Commission's rules. API also recommended that the 901-902/940-941 MHz frequencies be allocated on a primary basis for oil spill/disaster response communications, and on a secondary basis for regular day-to-day operational land mobile radio communications. In its subsequent Policy Statement and Order, and in this NPRM and Tentative Decision, the Commission has failed to address API's proposal.

32. API recognizes the Commission's objective is to provide spectrum for a new technology, PCS, and, while believing that allocation of the 901-902/940-941 MHz bands for emergency response communications best serves the public interest, API recognizes that the Commission has determined to proceed with dedicating this spectrum to PCS. API nevertheless urges the Commission to find other spectrum to accommodate its proposal in the near future. The Commission's refarming proposals in Docket No. 92-235 present an excellent

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16/(...continued)
§ 2.106, nn.NG112, US220 (1988). Since these frequencies are in different bands, equipment incompatibility has been a major problem. Also, none of these frequencies are available for trunking which makes frequency reuse impossible.

opportunity for the Commission to accommodate these needs, and API will again address this issue in that proceeding.

G. The Commission Should Adopt PCS Standards That Will Promote Compatibility and Competition

33. The Commission has suggested four options in creating PCS service areas in both the 900 MHz and 2 GHz bands. While API does not wish to comment in depth on the regulatory scheme for PCS, its members, as potential users of PCS, have an interest in certain market structure issues. API believes that there are two primary considerations for determining the size of the PCS service areas:
(1) compatibility of PCS systems and equipment, and
(2) competition in the marketplace. Regardless of which service area option the Commission chooses, of primary importance is the ability for each PCS system and equipment to be compatible with other PCS systems. A PCS user should be able to use the same handheld unit in all regions of the country. Otherwise, the purpose of PCS technology is inherently undermined.[17/] API suggests that the Commission create uniform technical rules and standards for all PCS

17/ By its own definition, PCS is a service offering which provides personal communications to its users. Inherent in PCS technology is an expectation that PCS units are sufficiently portable that they can be used throughout the U.S. without technical problems in other markets.

equipment. Technology in the various PCS service areas must be uniform in order to adhere to international standards, otherwise, the Commission's efforts toward international PCS compatibility are futile.

34. The second consideration, competition in the PCS marketplace, is also important in determining the size of PCS service areas. The Commission recognizes that larger PCS service areas reduce the opportunity for competition. API does not favor a particular service area option, but supports the option which best promotes a competitive marketplace. API urges the Commission not to encourage monopolistic or anti-competitive practices by creating PCS service areas which will ultimately give PCS licenses to a select few.

H. The Commission Must Be Sensitive To Potentially Harmful Biological Effects

35. API has reviewed a significant amount of the available literature concerning the possible adverse biological and health effects which may result from routine use of handheld radio transmitters at 800 MHz and above. To API's knowledge, there are no conclusive studies which either prove or disprove the possibility of adverse consequences from widespread use of handheld transmitters operating in the 1-3 GHz range. As the Commission's questions in this area

suggest, however, there is at least some reason to suspect that frequent use of such handheld transmitters may, over time, create health problems.

36. As a precaution, the Commission should take appropriate measures to obtain further data on this issue, including testing by federal agencies having responsibility for consumer devices. The frequencies being considered for PCS are in the same range as the frequencies used for microwave ovens. The lack of definite data on the potential for health risks should cause the Commission to require further study of any possible biological risks before handheld PCS units become a commonly available consumer item. At a minimum, the Commission should reconsider the appropriate power levels that may be permitted for this type of service. PCS was originally proposed as a very low power service. However, the Commission now suggests that greatly increase power levels may be used. Given the evolution that has occurred in the concept of this service, perhaps more consideration should be to health effects at these higher power levels. While reviewing this issue, the Commission should at a minimum ensure that no PCS equipment is authorized that does not at least meet the current ANSI standard.

III. CONCLUSION

37. As API has stated throughout this proceeding, it supports the development of new technology such as PCS. However, because the Commission has targeted the 2 GHz bands, which are used for critical communications by API member companies, API has expressed its strong reservation to this particular reallocation. Nevertheless, the Commission has proposed to proceed with licensing PCS systems in the 1850-1990 MHz band. This being the case, API urges the Commission to follow the transition procedures which API has outlined above to ensure that minimal interference is caused to these critical POFS systems during the introduction of PCS to this frequency band.

38. To ensure that this is an orderly transition, the Commission should adopt the interference criteria procedures which API has outlined in Exhibit A. Furthermore, the Commission should give incumbent POFS operators a reasonable period of at least five years in which to enter into voluntary negotiation with prospective PCS operators before mandatory relocation to new frequency bands occur. Special provision should be made for immediately relocating users in the 1910-1930 MHz band where the Commission has proposed permitting unlicensed PCS operations. Because the unlicensed operations will make it impossible to predict when and where

interference will occur, POFS operators, such as API members, will be forced to immediately relocate their systems to other spectrum. API has proposed a reasonable one-year transition period during which this immediate re-licensing could take place and appropriate compensation procedures. There is no rationale by which the Commission should treat licensees in this band any differently than they are proposing to treat licensees in other portions of the band that must be shared with PCS operations. Systems in the 1910-1930 MHz band ae equally critical and compensation is equally justified.

WHEREFORE, API strongly urges the Commission to adopt the proposals set forth in these comments regarding interference criteria, relocation and compensation mechanisms, and PCS licensing procedures.

Respectfully submitted

THE AMERICAN PETROLEUM INSTITUTE

By: Wayne V. Black

Wayne V. Black
Christine M. Gill
Rick D. Rhodes
Tamara Y. Davis

Keller and Heckman
1001 G Street, N.W.
Suite 500 West
Washington, D.C. 20001
(202) 434-4100
Its Attorneys

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EXHIBIT A

Proposed Interference Engineering Criteria

The sharing of microwave spectrum by co-existing POFS and PCS operations creates serious interference potential to POFS operations since both base station and mobile transmitting equipment will be a part of any PCS system. API agrees with the Commission that the calculation of interference from PCS base facilities to POFS operations may be adequately performed by application of the Bulletin 10-E standard and by assuring that the sum total of all base facilities in a given microwave environment do not exceed the Bulletin 10-E standard. API further agrees with the Commission that the PCS base station interference calculations should be based on "standard line of sight" practices, except in cases where blockages of a permanent and substantial character would permit the use of accepted "over the horizon" loss calculation techniques.

Nonetheless, accurate calculation of interference from PCS mobile units into POFS facilities will be difficult. During the PCS experiments conducted over the last several months, two ways of calculating interference created by PCS mobiles have emerged. POFS incumbent licensees have assumed "line of sight" conditions which in certain instances may be overly conservative. Conversely, PCS interests generally have used "median loss equations" developed for predicting mobile

radio coverage. This approach results in an overly optimistic picture which may actually underestimate the interference level to POFS operations which will be created by PCS mobile units. This is because the few PCS mobile units that have less than the "median loss propagation" back to a POFS station will contribute a disproportionate amount of interference to the "victim" POFS receiver.

While API agrees with the Commission that proper methods exist with which to apply statistical techniques to the "mobile-to-fixed" interference problem, a special case is present that must be handled separately, since POFS operations are critical and cannot, as a practical matter, tolerate any noticeable interference. This exception is created when the PCS mobile unit operates too closely in a geographic sense to the POFS receiver. Signals received from PCS mobile units will, of course, be proportional to the power output of such units and inversely proportional to the square of the distance separating such units from a given POFS installation. This means that as the distance between the PCS mobile unit and POFS station approaches zero, the level of interference created by the PCS mobile rises to unacceptable levels regardless of how low the PCS unit transmit power may be.

Based on the foregoing, it is imperative that an "exclusion zone" be clearly established around each POFS receiver and that no PCS mobile transmitter be allowed to operate within that "exclusion zone". While API agrees with American Personal Communications (APC) that such an exclusion zone must exist in order for shared PCS/POFS operations to take place, the calculation of the size of the exclusion zone varies due to the differences discussed above in the method used to calculate mobile interference to POFS installations.

API proposes the following engineering method by which PCS systems may be engineered into the POFS spectrum environment. This engineering method is designed to satisfy the following essential criteria.

a. The exclusion zone established around each POFS receiver must ensure that one PCS mobile unit under "line of sight" conditions would not exceed the interference thresholds of Bulletin 10-E.

b. The total of all PCS base station interference sources must not collectively exceed the interference thresholds of Bulletin 10-E.

c. The statistically estimated collective interference from all mobile "fleets" operating in all PCS user areas must not exceed the thresholds established in Bulletin 10-E.

Figure 1 (attached) is used in discussing API's proposed methodology for estimating collective statistical interference potential which may be experienced from a fleet of PCS mobiles. For purposes of this analysis, a non-coherent random addition of interfering signals is presumed. Depending upon a given PCS system's design, some accommodation must be made for the possibility of a more synchronous signal addition, since it is possible that many of the interfering PCS signals could be "in step" with each other at any given time. If PCS mobile unit operations are not confined to one small area within the given market as shown in figure 1, the calculation is simply repeated for as many small areas as it takes to cover the actual three-dimensional total proposed area of PCS operations. The total interference will equal the sum of the interference received from all of the smaller areas. Nonetheless, by reducing the total PCS service area into smaller user areas, many of the equational variables in such an analysis may be transformed essentially into constants and thereby simplify the task of analysis. The PCS "user area

number 1" shown on attached Figure 1 has been made small enough for purposes of the analysis that:

a. The free space loss differential between the closest and most distant parts of PCS "user area number 1" is less than approximately 3 dB. Hence, a single median free space loss value can be assumed from any location within PCS user area number 1;

b. The width and depth of PCS user area number 1, as seen from the perspective of the POFS station must correspond to azimuth and elevation angle differentials which are small enough that variations in antenna gain of the POFS station in the direction of PCS "user area number 1" will be less than 3 dB; hence a single median antenna gain can be assumed for purposes of the analysis in receiving from any point within PCS "user area number 1".

It is a relatively simple step to calculate the sum total of interference which will be generated from non coherent PCS "User Area No. 1", using the following equation.

EXHIBIT A

PCS INT = PCS UNIT PWR + 10 LOG[18/] (NUMBER PCS USERS) -
(dbm) (dbm) (peak busy hour)

FREE SPACE LOSS TO USER AREA NO. 1 -
(db)

ADDITIONAL STATISTICALLY CALCULATED PATH LOSS +
(db)

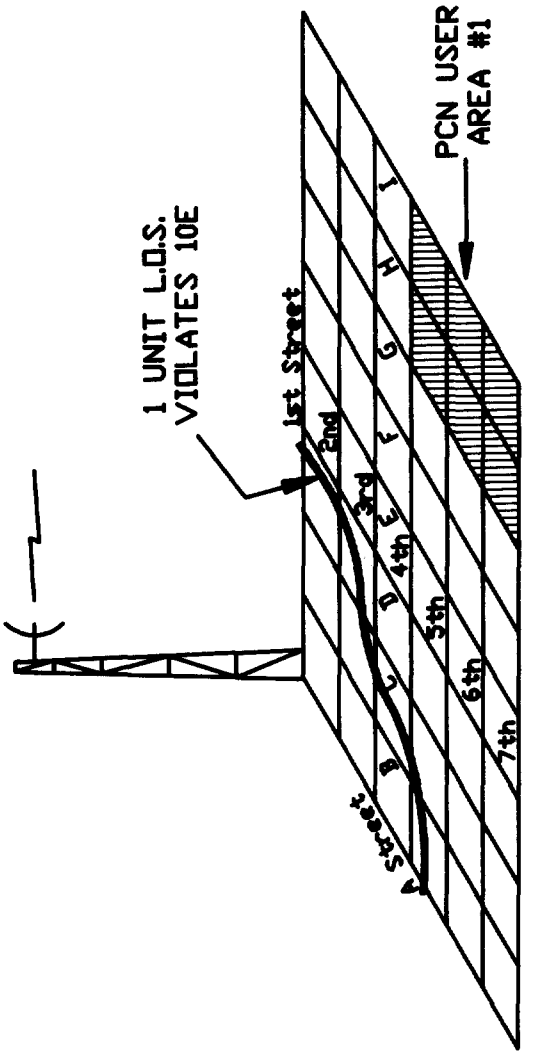
POFM ANTENNA GAIN IN THE DIRECTION OF PCS USER AREA NO. 1 -
(db)

POFM TRANSMISSION LINE LOSS.
(db)

The above calculation can be repeated for PCS User Areas No. 2, 3, 4, etc. in order to evaluate the total impact upon the POFS station under evaluation. Methods for determining the Additional Statistically Calculated Path Loss will need to be refined. A starting point is work that previously has been done in connection with cellular frequency usage. While this is a different frequency range, and hence may have some differing characteristics, it is a good starting point for evaluation.

18/ Coherent PCS signals would approach 20 log (number of PCS users).

EXHIBIT A
FIGURE 1



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CERTIFICATE OF SERVICE

I, Patt Meyer, a secretary in the law firm of Keller and Heckman, do hereby certify that a copy of the foregoing Comments of the American Petroleum Institute has been served this 9th day of November, 1992 by hand delivery to the following:

The Honorable Alfred C. Sikes
Chairman
Federal Communications Commission
1919 M Street, N.W., Room 814
Washington, D.C. 20554

The Honorable James H. Quello
Commissioner
Federal Communications Commission
1919 M Street, N.W., Room 802
Washington, D.C. 20554

The Honorable Sherrie P. Marshall
Commissioner
Federal Communications Commission
1919 M Street, N.W., Room 826
Washington, D.C. 20554

The Honorable Andrew C. Barrett
Commissioner
Federal Communications Commission
1919 M Street, N.W., Room 844
Washington, D.C. 20554

The Honorable Ervin S. Duggan
Commissioner
Federal Communications Commission
1919 M Street, N.W., Room 832
Washington, D.C. 20554

Dr. Thomas P. Stanley, Chief
Office of Engineering and Technology
Federal Communications Commission
2025 M Street, N.W., Room 7002
Washington, D.C. 20554

Robert Pepper, Chief
Office of Plans and Policy
Federal Communications Commission
1919 M Street, N.W., Room 822
Washington, D.C. 20554

Ralph Haller, Chief
Private Radio Bureau
Federal Communications Commission
2025 M Street, N.W., Room 5002
Washington, D.C. 20554

Cheryl A. Tritt, Chief
Common Carrier Bureau
Federal Communications Commission
1919 M Street, N.W., Room 500
Washington, D.C. 20554

Bruce A. Franca, Deputy Chief
Office of Engineering and Technology
Federal Communications Commission
2025 M Street, N.W., Room 7002
Washington, D.C. 20554

Terry L. Haines, Esquire
Chief of Staff, Office of the Chairman
Federal Communications Commission
1919 M Street, N.W., Room 814
Washington, D.C. 20554

Mr. Fred Thomas
Office of Engineering and Technology
Federal Communications Commission
2025 M Street, N.W., Room 7002
Washington, D.C. 20554

Patt Meyer